Date: Thu, 19 Aug 93 04:30:23 PDT
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V93 #15
To: Ham-Homebrew

Ham-Homebrew Digest Thu, 19 Aug 93 Volume 93 : Issue 15

Today's Topics:

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

Date: Wed, 18 Aug 1993 19:20:30 GMT
From: swrinde!sdd.hp.com!col.hp.com!news.dtc.hp.com!srgenprp!
alanb@network.ucsd.edu
Subject: DSP receiver (was: Single frequency receiver)
To: ham-homebrew@ucsd.edu

Jon Bloom, KE3Z (jbloom@arrl.org) wrote:
: In rec.radio.amateur.homebrew, alanb@sr.hp.com (Alan Bloom) writes:
: >Zack Lau (zlau@arrl.org) wrote:
: >
: >: It might be interesting to do a DSP receiver with a TRF front end
: >: when the technology gets cheap enough for your budget. ...
: >
: >There are two main challenges with the idea. One is dynamic range. ...

: Exactly. And in order to achieve the theoretical dynamic range of
: any A/D, the analog circuitry "up front" in the A/D must exhibit

: dynamic range sufficient to the task. ...

: >The other problem is sample rate. ...
: >Even if you undersample, the sample-and-hold circuit must be specified
: >at the RF/IF frequency, not at the sample rate. With a superhet, you
: >can use a fairly low last IF frequency, greatly easing the S/H specs.
: >A 60+ MHz S/H with 16-bit accuracy is not a low-cost off-the-shelf item!

: You bet. And the more bits you use, the more stringent the
: requirements on the S/H. ...

: By the way, this stuff isn't just theory. Sampling at IF is what W-J's
: DSP-based receiver does. ...

: For the time being, at least, down conversion to a low IF is still the
: best approach for a DSP-based ham receiver. ...

I was just about to throw away my copy of RF Design Magazine's
"1993/1994 Directory" (since it is mostly just a catalog of ads) when I
noticed a real article buried in the center of the book:

> "A DSP-Based Approach to HF Receiver Design..." by R.M. Lober

The article describes Watkins-Johnson's DSP-based HF receiver along with
a very readable quick description of analog receiver basics and how to
apply DSP technology to same. The author addresses the subject of this
string directly:

> "At first glance, it appears that a true digital receiver is
> formed by direct application of the amplified HF (i.e. 2 to 30 MHz)
> frequency range to a high speed A/D converter. However state-of-
> the-art A/D converters operating at greater than 100 MHz (i.e. the
> required minimum sampling rate if the anti-aliasing filter is to
> be of practical design) have a limited dynamic range due to the
> number of available bits. This is currently 10 bits, which results
> in 60 dB of dynamic range -- much too low for the HF spectrum...
> Therefore the design of a digital receiver usually involves
> frequency conversion to near baseband by using an analog
> superheterodyne front end.
>
> Since all active devices are somewhat non-linear in practice, and
> an A/D converter is made up of active analog components,
> intermodulation distortion becomes important, not only in all
> receiver circuitry before the A/D converter, but within the A/D
> converter itself. ...

The author must be on the right track, since he confirms what we said :=)

AL N1AL

Date: 18 Aug 93 09:27:22 est
From: psinntp!arrl.org@uunet.uu.net
Subject: Electro-nostalgia CHALLENGE; was: Re: Why aren't electronics cool any more?
To: ham-homebrew@ucsd.edu

In rec.radio.amateur.homebrew, mcovingt@aisun3.ai.uga.edu (Michael Covington) writes:

[deletions]

>One particular byway of electronic history that intrigues me is
>low-voltage vacuum tubes -- that is, tubes that operate off a single
>12-volt supply. They were introduced (for car radios) around 1958 and
>became obsolete around 1960 when good RF transistors became affordable.
>So they're an almost-forgotten chapter of history.

Yes, it was amusing: Good RF transistors weren't out, but designers couldn't get enough audio power outta tubes operating at 12 V. So the low-V tubes ultimately drove big germanium audio power transistors to wiggle the speaker. *QST*/the ARRL *Handbook* had a mobile converter that used these tubes.

>My challenge: DO SOMETHING INTERESTING WITH THEM. They are still
>available from Antique Electronic Supply, Tempe, Arizona, and at
>hamfests. The 12U7 (not 12AU7) dual triode is one of the most useful;
>they also had a pentagrid converter and a few other things.
>In a pinch, a 12AT7 will substitute for a 12U7 and work OK in
>some low-voltage tube circuits.
>
>Any takers?

Is fun. I mentioned them in *QST* Hints and Kinks sometime ago as possible options to "solid-stating" Collins permeability tuned oscillators.

On the home front, last November I easily achieved 38 kilomiles/watt on 40 meters with a 12EA6 crystal oscillator running at 12.6 V on all elements. (*Easily* doesn't mean I'm breaking my arm patting myself on the back; a low dipole and one CQ did it.) The system was operating at about 8 milliwatts at the antenna feedpoint.

Some of the "few other things" available in this tube range

include RF pentodes like 12EA6, 12EK6 and 12DZ6 (I forget which are remote cutoff and which are sharp). Folks interested in thermionic physics may get a kick out of some of the approaches used to try to force useful audio power out of them (space-charge-cathode tetrodes) and get reasonable AGC slope (hexode or heptode RF/IF amplifiers).

These tubes are tricky in the sense that they're "contact potential" biased (no cathode resistor, big [megohms] grid resistor) -- and contact potential is a somewhat slidy, tube-to-tube-variable characteristic. But, for instance, they make nice regenerative detectors for folks who want tube-regen smoothness at transistor voltages. And they'd make nice multistage QRP transmitters for folks who want to experience the ins and outs of playing with things like peakable output matching, neutralization, grid-leak bias and screen-grid power control without having to build high-voltage power supplies necessary for reasonable operation with "normal" tubes. (Hint, though: Try running one of those "Command" surplus receivers at 28 V on its heaters *and* plate/screen supply. It will work, albeit with less output and smaller dynamic range.) A dual triode would let you play with a cross-neutralized push-pull amplifier -- textbook-perfect neutralization achievable in this configuration as opposed to single-ended circuits, which are a compromise.

Regards/WJ1Z

David Newkirk, Senior Asst Tech Editor | voice: 203-666-1541 X280
American Radio Relay League | fax: 203-665-7531
225 Main St, Newington CT 06111 USA | net: dnewkirk@arrl.org

Date: Wed, 18 Aug 1993 16:05:37 GMT
From: pravda.sdsc.edu!news.cerf.net!usc!howland.reston.ans.net!europa.eng.gtefsd.com!emory!kd4nc!ke4zv!gary@network.ucsd.edu
Subject: Electro-nostalgia CHALLENGE; was: Re: Why aren't electronics cool any more?
To: ham-homebrew@ucsd.edu

In article <24s7as$6gm@usenet.INS.CWRU.Edu> aa570@cleveland.Freenet.Edu (Jim Cole) writes:
>
>Those Low-voltage tubes were called Nuvistors. I still have 2-3 from
>my early TV repair days.

No, Nuvistors (TM RCA) were small, like an overgrown TO-5, metal
triodes used as "low noise" amplifiers in several systems, including
the RCA New Vista TV set. The Ampex VR2000 quadraplex videotape machine
used them as head preamps, and early RCA color studio cameras used them
as preamps as well. I still have a box of them around, we retired our
last quad machine a year and a half ago (sniff). They were normally
operated at 75 to 200 volts on the plate. In the RCA cameras and the
Ampex tape machine, they were run at 150 volts.

I built a 432 MHz preamp with one when they first came out. It wasn't
quite as good as the cavity preamp using the WE416B, but was a lot
cheaper.

Gary

Gary

--
Gary Coffman KE4ZV |"If 10% is good enough | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | for Jesus, it's good | uunet!rsiatl!ke4zv!gary
534 Shannon Way | enough for Uncle Sam."| emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | -Ray Stevens |

Date: 18 Aug 1993 13:19:34 GMT
From: news.larc.nasa.gov!grissom.larc.nasa.gov!kludge@uunet.uu.net
Subject: Electro-nostalgia CHALLENGE; was: Re: Why aren't electronics cool any
more?
To: ham-homebrew@ucsd.edu

In article <24s7as$6gm@usenet.INS.CWRU.Edu> aa570@cleveland.Freenet.Edu (Jim Cole)
writes:
>
>Those Low-voltage tubes were called Nuvistors. I still have 2-3 from
>my early TV repair days.

Nope, completely different devices. The Nuvistors (6CW4 and its big brothers)
are little metal cans with a B+ in the 50V to 90V range. These things are
actually useful! Very nice for VHF front ends (like TV tuners). Pretty
good for portable audio gear, although they tend to be microphonic (only
in one direction, though!). Great for instrumentation amplifiers and the
like.
--scott
   (who uses them in his RIAA phono preamp at home)
--
"C'est un Nagra. C'est suisse, et tres, tres precis."

Date: 18 Aug 93 21:47:58 GMT
From: ogicse!emory!wupost!waikato!comp.vuw.ac.nz!actrix.gen.nz!
arnim@network.ucsd.edu
Subject: Kits list - CTCSS feedback
To: ham-homebrew@ucsd.edu

For some input on the CTCSS stuff, there are at least two methods
being used that I know of...

Firstly, an NZ manufacturer of mobile radios, Tait Radio in
Christchurch, does the CTCSS in firmware, in, I believe, a 6805
flavour uC.

Secondly, there is a specialist comms IC manufacturer in the UK that
makes, among other things, CTCSS encoders and decoders. The dual
function device is called the FX365. I cannot vouch for it
personally, but if you want more details, CML can be faxed at
(+44)-376-518247, the address is 1 Wheaton Road, Essex CM8 3TD.
Btw, CML = Consumer Microcircuits Ltd.

Another btw - CTCSS = Continuous Tone Call Signalling System, or
something very similar, which is using tones below 300 Hz for control
signalling, for example, in trunked radio applications.

For what it's worth...

Arnim   arnim@actrix.gen.nz

Date: 18 Aug 93 19:19:13 GMT
From: timbuk.cray.com!hemlock.cray.com!andyw@uunet.uu.net
Subject: PLL questions..
To: ham-homebrew@ucsd.edu

I wish I'd paid more attention when I was in college, but
I didn't, so here I am asking dumb questions..

I'm looking at using the Motorola MC13176D as a local
oscillator in a UHF receiver. In the data sheet, it
suggests a wide loop bandwidth in this application, in
order to reduce noise on the output. How wide is wide ?
The phase comparator in the 13176 has an output impedance
of around 73KOhm, the CCO has an input impedance of 500 Ohm.
If I opt to just use an RC low-pass filter, it's hard
to get one with a Fc around 100KHz with such a high

input impedance - should I use a buffer to present
a lower impedance to the filter ?

I'm also interested in using the same component as
a TX exciter, and then I need a narrow loop bandwidth,
if I'm going to directly modulate the CCO, how narrow
is narrow ?

If anyone has a "PLL in 3 paragraphs" document lying
around, I'm sure I'm not the only person who would
benefit from a clarification of natural frequency, loop
gain, damping factor, and loop bandwidth.

--
andyw.   N0REN/G1XRL

andyw@aspen.cray.com   Andy Warner, Cray Research, Inc. (612) 683-5835

Date: 18 Aug 1993 10:56:51 GMT
From: munnari.oz.au!ariel.ucs.unimelb.EDU.AU!werple.apana.org.au!
zikzak.apana.org.au!usenet@network.ucsd.edu
Subject: What kits would you like to see?
To: ham-homebrew@ucsd.edu

>mcovingt@aisun3.ai.uga.edu (Michael Covington) writes:
>: I'm getting ready to do some free-lance designing, and would like to start
>: a discussion...
>:
>: What kind of kits would you like to see...?
>:
>: What kinds of construction projects would you like to see...?

How about readouts for car management systems, so that the
average person knows what is happening to his/her car.
Or is that a proprietry no no?

Date: Wed, 18 Aug 1993 17:04:40 GMT
From: mentor.cc.purdue.edu!noose.ecn.purdue.edu!stable.ecn.purdue.edu!
laird@purdue.edu
Subject: What kits would you like to see?
To: ham-homebrew@ucsd.edu

I would love to see (and I've offered to pay for) kits for dimming
lights. This seems like such a basic request, and it's one that

I've seen several times.

At the simple end, this should be a tiny module that accepts AC
and an n-bit digital word, and has AC out (to a light). At the
complex end, it would use addressable serial communications (using
that Motorola device - I can look it up later.), and perhaps be
able to return some status (like "Bulb Good").

My current application for such a device is for home lighting
control. If I could just mount these modules at each light, and
connect them to the central computer, I'd be all set.

BTW, if anyone wants to design and make these for me, I'll gladly
pay. I'm thinking of something in the range of $10-$30 each for
about 30 modules with addressable serial interfaces (RS-485?), and
Good dimming qualities. (Then you could sell your story and
schematics to Circuit Cellar Ink. and make a bunch more money!)

--kyler

Date: Wed, 18 Aug 1993 18:42:10 GMT
From: netcomsv!netcom.com!jonin@decwrl.dec.com
Subject: What kits would you like to see?
To: ham-homebrew@ucsd.edu

Michael Covington (mcovingt@aisun3.ai.uga.edu) blurted:
: I'm getting ready to do some free-lance designing, and would like to start
: a discussion...

: What kind of kits would you like to see offered by companies like Ramsey
: and others in the under-$40-per-kit class?

 Well - Personally I would like to see a digital voice recorder and
playback. :) would be expecially nice if the voice could be stored
on eeprom so I could power off the circuit and still play back the
sample at a later time. :)
--
Evil Geniuses /\ ___   ___   o ___ o @netcom.com 37.16N 121.58W 200ft.
For A \ oo / / // _ \ / / \ /\ / / \ __o --- Squidly Diddly Says ---
Better \--/__/ // |/ // / // // / /(oO) A Penny Saved is Rediculous
Tommorow\/___/ ___/ \/ / \/ \/ / /||\

Date: 18 Aug 1993 18:54:06 GMT
From: swrinde!gatech!concert!news-feed-2.peachnet.edu!hobbes.cc.uga.edu!

aisun3.ai.uga.edu!mcovingt@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <837@wpsun4.UUCP>, <24t1tj$ck6@zikzak.apana.org.au>,
<1993Aug18.155804.21260@ke4zv.uucp>un3.ai.u
Subject : Re: What kits would you like to see?

In article <1993Aug18.155804.21260@ke4zv.uucp> gary@ke4zv.UUCP (Gary Coffman)
writes:
>In article <24t1tj$ck6@zikzak.apana.org.au> petert@zikzak.apana.org.au (Peter T.)
writes:
>>
>>How about readouts for car management systems, so that the
>>average person knows what is happening to his/her car.
>>Or is that a proprietry no no?
>
>Oh, this is a good one, commercial units go for over $1,000, but
>they're really simple devices, a single chip micro and a bit of
>glue. Maybe a bit more than $40, but definitely a project needing
>to be done.

Yes; the right way to do it would probably be as a very simple hardware
interface to your laptop computer, together with software.
--
:- Michael A. Covington, Associate Research Scientist   :   *****
:- Artificial Intelligence Programs   mcovingt@ai.uga.edu : *********
:- The University of Georgia   phone 706 542-0358 :   * * *
:- Athens, Georgia 30602-7415 U.S.A.   amateur radio N4TMI : ** *** ** <><

Date: Wed, 18 Aug 1993 15:58:04 GMT
From: pravda.sdsc.edu!news.cerf.net!usc!howland.reston.ans.net!
europa.eng.gtefsd.com!emory!kd4nc!ke4zv!gary@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <24jtrj$1hi@hobbes.cc.uga.edu>, <837@wpsun4.UUCP>,
<24t1tj$ck6@zikzak.apana.org.au>eng.g
Reply-To : gary@ke4zv.UUCP (Gary Coffman)
Subject : Re: What kits would you like to see?

In article <24t1tj$ck6@zikzak.apana.org.au> petert@zikzak.apana.org.au (Peter T.)
writes:
>>mcovingt@aisun3.ai.uga.edu (Michael Covington) writes:
>>: I'm getting ready to do some free-lance designing, and would like to start
>>: a discussion...
>>:
>>: What kind of kits would you like to see...?

>>:
>>: What kinds of construction projects would you like to see...?
>
>How about readouts for car management systems, so that the
>average person knows what is happening to his/her car.
>Or is that a proprietry no no?

Oh, this is a good one, commercial units go for over $1,000, but
they're really simple devices, a single chip micro and a bit of
glue. Maybe a bit more than $40, but definitely a project needing
to be done.

Gary
--
Gary Coffman KE4ZV |"If 10% is good enough | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | for Jesus, it's good | uunet!rsiatl!ke4zv!gary
534 Shannon Way | enough for Uncle Sam."| emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244 | -Ray Stevens |

Date: 18 Aug 1993 17:03:01 GMT
From: pravda.sdsc.edu!news.cerf.net!usc!howland.reston.ans.net!gatech!news-
feed-2.peachnet.edu!hobbes.cc.uga.edu!aisun3.ai.uga.edu!mcovingt@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <24jtrj$1hi@hobbes.cc.uga.edu>, <837@wpsun4.UUCP>,
<24t1tj$ck6@zikzak.apana.org.au>news-
Subject : Re: What kits would you like to see?

In article <24t1tj$ck6@zikzak.apana.org.au> petert@zikzak.apana.org.au (Peter T.)
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>>mcovingt@aisun3.ai.uga.edu (Michael Covington) writes:
>>:
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>>: What kinds of construction projects would you like to see...?
>
>How about readouts for car management systems, so that the
>average person knows what is happening to his/her car.
>Or is that a proprietry no no?

Great idea, but I don't have the information necessary to tackle it;
I hope someone does. I can't see how the car mfr. could stop you from
reading the data in your car (although they could withhold some
information about how to do so).

--
:- Michael A. Covington, Associate Research Scientist   :   *****

:- Artificial Intelligence Programs   mcovingt@ai.uga.edu : *********
:- The University of Georgia   phone 706 542-0358 :   * * *
:- Athens, Georgia 30602-7415 U.S.A.   amateur radio N4TMI : ** *** ** <><

Date: Wed, 18 Aug 1993 12:54:45 GMT
From: dog.ee.lbl.gov!overload.lbl.gov!agate!howland.reston.ans.net!
europa.eng.gtefsd.com!emory!news-feed-1.peachnet.edu!concert!inxs.concert.net!
taco!npstewar@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <24po7c$ou8@senator-bedfellow.MIT.EDU>, <24r87r$462@hobbes.cc.uga.edu>,
<24r9kqINNksb@rave.larc.nasa.gov>ry
Subject : Re: Electro-nostalgia CHALLENGE; was: Re: Why aren't electronics cool
any more?

In article <24r9kqINNksb@rave.larc.nasa.gov> kludge@grissom.larc.nasa.gov (Scott
Dorsey) writes:
>In article <24r87r$462@hobbes.cc.uga.edu> mcovingt@aisun3.ai.uga.edu (Michael
Covington) writes:
>>
>>One particular byway of electronic history that intrigues me is
>>low-voltage vacuum tubes -- that is, tubes that operate off a single
>>12-volt supply. They were introduced (for car radios) around 1958 and
>>became obsolete around 1960 when good RF transistors became affordable.
>>So they're an almost-forgotten chapter of history.
>>
>>My challenge: DO SOMETHING INTERESTING WITH THEM. They are still
>>available from Antique Electronic Supply, Tempe, Arizona, and at
>>hamfests. The 12U7 (not 12AU7) dual triode is one of the most useful;
>>they also had a pentagrid converter and a few other things.
>>In a pinch, a 12AT7 will substitute for a 12U7 and work OK in
>>some low-voltage tube circuits.
>
>Actually, I played with these a while back, attempting to use some for
>audio work, and found them to be a real pain. You might want to look
>at the R-392 receiver, which uses 28V exclusively, for filaments and
>plates, and actually does a respectable job of it.
>
>These days, they aren't worth the trouble, since you can buy little
>power supply bricks intended for vacuum fluorescent displays. In
>a cubic inch you can get 15 mA at 200V, plenty of current to run a
>couple of 12AX7s or a bunch of nuvistors. If you're doing portable
>tube gear (which I am), they are recommended.

A few months back, Craig Anderton (who still sells all kinds of kits
for musical instrument related projects) did a 12AX7 distortion box

that ran the 12AX7 on 42V plate. The transformer secondary was only
12 V, but he used a hex cmos inverter (4049) and 5 1N4001 diodes for
the voltage multiplier. Craig mentioned that the 12AX7 was very non-
linear in that region, but that was kinda the goal, since it was a
distortion box.

The vfd bricks sounds good, but to do a small amplifier, it sounds like
maybe using three. You could use one for each half of a 12AU7 maybe and
get 3-5 watts in a push pull arrangement. You'd still need a custom
transformer though, unless someone else has a neat little trick. Given
the size, you could afford the space of three. How much do these things
cost, and where can you find them?

Nate

Date: 18 Aug 1993 18:40:27 GMT
From: news.larc.nasa.gov!grissom.larc.nasa.gov!kludge@uunet.uu.net
To: ham-homebrew@ucsd.edu

References <24r87r$462@hobbes.cc.uga.edu>, <24r9kqINNksb@rave.larc.nasa.gov>,
<1993Aug18.125445.14562@ncsu.edu>net
Subject : Re: Electro-nostalgia CHALLENGE; was: Re: Why aren't electronics cool
any more?

In article <1993Aug18.125445.14562@ncsu.edu> npstewar@eos.ncsu.edu (NATHAN PHILLIP
STEWART) writes:
>
>The vfd bricks sounds good, but to do a small amplifier, it sounds like
>maybe using three. You could use one for each half of a 12AU7 maybe and
>get 3-5 watts in a push pull arrangement. You'd still need a custom
>transformer though, unless someone else has a neat little trick. Given
>the size, you could afford the space of three. How much do these things
>cost, and where can you find them?

Yes, you won't get a lot of power out of them. They turn up all the time
at hamfests, and you can gut them out of fluorescent displays, which also
turn up frequently. If you want to buy them new, Endicott Research in
Endicott, NY makes a wide variety of them, but you're going to pay $30
or so for the 15 mA version. They also have a 45 mA version. I have
seen foreign made 100 mA units around out of salvaged gear, but wouldn't
have a clue where to get them new.
--scott
--
"C'est un Nagra. C'est suisse, et tres, tres precis."

End of Ham-Homebrew Digest V93 #15
****